

Application No. 09/784761 (Docket: BAN.0103)
37 CFR 1.111 Amendment dated 07/12/2006
Reply to Office Action of 02/14/2006

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REMARKS/ARGUMENTS

In the Office Action, the Examiner noted that claims 1-45 are pending in the application. The Examiner additionally stated that claims 1-45 are rejected. By this amendment, claims 6, 13, 20, 28, and 34 are cancelled and claims 1, 5, 7-9, 11, 14-17, 19, 21, 23-24, 27, 29-30, 33, 35, and 40 are amended. Hence, claims 1-5, 7-12, 14-19, 21-27, 29-33, and 35-45 are pending in the application.

Applicant hereby requests further examination and reconsideration of the application, in view of the foregoing amendments.

In the Specification

Applicant has amended the specification to secure a substantial correspondence between the claims amended herein and the remainder of the specification. No new matter is presented.

In the Claims

Rejections Under 35 U.S.C. §103(a)

The Examiner rejected claims 1-14 under 35 U.S.C. 103(a) as being unpatentable over Susnow et al., US 6,751,235 (hereinafter, Susnow) in view of Cheriton et al., US 6,675,200 (hereinafter Cheriton), in view of "Construction of Virtual Private Distributed System by Comet," Jinzaki et al. (hereinafter, Jinzaki), 1/18/2000 (previously cited in the IDS), in further view of Avery, US 2004/0015622 (hereinafter, Avery). Applicant respectfully traverses the Examiner's rejections.

Prior to providing a claim-by-claim analysis, an overview of the teachings of Susnow and Cheriton are is now provided to aid the Examiner in his reconsideration of the rejections.

Susnow teaches a technique for synchronizing a communication link by a network interface having a transmitter in a core clock domain that is different from the link clock domain of the communication link (Abstract). With regard to application of his invention, Susnow states that it is applicable for use with all types of computer networks including designs which link together disparate processing systems. Of the examples of such networks, Susnow includes NGIO and Infiniband (col. 2, lines 40-52). With

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particular reference to configuration of a host processing system 330 according to his invention, Susnow introduces a fabric channel adapter 339 that is connected between the I/O and memory controller 333 and the network switching fabric 100. Susnow states that the channel adapter 339 (339' if it is connected to a PCI bus) may have therein a software stack to access the network fabric 100 and information about fabric configuration, fabric topology, and connection information. Although not shown, Susnow notes that an operating system within the host 330 performs common functions such as sending and receiving I/O transaction messages and remote direct memory access operations (col. 3, line 67- col. 4, line 42). Although Susnow teaches the architecture of a typical present day computer network in the noted paragraphs, the problem that he notes and which he addresses is synchronization of physical layer communication links between a core clock domain and a link clock domain, as discussed with reference to figures 7-9. Susnow does not address TCP/IP offload of a server. In fact, one skilled in the art can infer from the teachings of Susnow that he is addressing a problem inherent in a communication system that employs VI as an upper layer protocol. Several problems exist because *VI does not specify an underlying transport mechanism*. Susnow lists these limitations stating that "there are no provisions for flow control, buffer management, segmentation and reassembly, and link synchronization." (col. 6, lines 49-52) The remainder of his patent focuses on how to address the link synchronization limitation. He alludes to RDMA functions in passing as functions common to host adapter drivers and also refers to Infiniband and NGIO as other architectures to which his link synchronization solution applies, and such may be true, but his characterization of these functions and architectures is restricted to dealing with link synchronization issues.

Cheriton teaches modifying a standard TCP header (see Fig. 1) to provide for an RDMA option, where a sender *must place option bytes in the header of each TCP segment containing RDMA data*. The RDMA option bytes describe the location of the RDMA data in the TCP payload to the receiver, which allows the receiving system to load the RDMA data directly to an application memory without making intermediate copies. Thus, Cheriton teaches a *wire line protocol only* where information is embedded within a TCP segment that directs a receiver to execute an RDMA operation that is associated

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with payload data within that TCP segment. Cheriton's goal is to reduce the amount of data copying needed to transfer large blocks of data over a network and his particular application is moving data over a storage area network. By laying a shim protocol on top of TCP, but logically underneath higher level disk and file access protocols (e.g., SCSI), the location of RDMA data within a TCP payload is identified and can be appropriately moved to memory. (col. 1, line 37 through col. 2, line 20) Cheriton's invention does reduce the number of intermediate buffer copies required over a TCP/IP network, but he does not bypass TCP/IP processing on a server's TCP/IP stack. In fact, Cheriton implies that offloading TCP/IP protocol processing onto the network interface is undesirable because it is "complicated and does not lend itself to a simple hardware realization". (col. 3, lines 35-38) His invention enables the network interface to "circumvent complex protocol header parsing." (col. 3, line 30 through col. 3, line 45) Cheriton thus teaches away from the present invention. Furthermore, Cheriton does not teach, suggest, allude to, hint at, or provide any motivation whatsoever that would point one skilled in the art to associate TCP/IP connection parameters with a work queue number for each of a plurality of accelerated TCP/IP connections. Rather, Cheriton teaches a wire protocol that contains an RDMA ID (RID) field. The RID is an application -level identifier that a receiving system can use to associate or map the transfer *to an application buffer*. (col. 4, lines 7-10). What Cheriton teaches is a technique of embedding a buffer identifier within a TCP/IP header. As one skilled in the art will appreciate, an RDMA-accelerated TCP/IP connection may utilize thousands of buffer identifiers, each corresponding to a particular RDMA transfer. Cheriton's buffer identifiers serve the same purpose as Infiniband L_Keys and R_Keys (see the Infiniband™ Architecture Specification Volume I, Release 1.0), or iWARP Steering Tags (STags). Cheriton in no way suggests associating his buffer identifiers with a work queue which is used to post application-layer work requests to an adapter, nor does he even suggest evaluating these buffer identifiers in the context of the accelerated TCP/IP connection to which they correspond (e.g. to perform security checks, etc). Applicant has thoroughly search Cheriton to find any mention of a "queue" or "work queue" such as is recited in Applicant's claims and finds that Cheriton is utterly silent in this regard.

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Applicant's invention, on the other hand, does just that. A work queue number according to the present invention uniquely identifies a single accelerated TCP/IP connection, which may utilize many different buffer identifiers which are parameters within "work requests" submitted by server application software. Work requests are called "send queue elements" or "receive queue elements" when enqueued on a work queue, as clearly discussed with reference to FIGURE 7 of the instant application. Such use of buffer identifiers (e.g., STags, L_Keys, R_Keys) as parameters within "work requests" is consistent with both the InfiniBand and iWARP architecture specifications.

In stark contrast to the techniques taught by Cheriton, Applicant's invention is directed toward techniques that allow servers to offload TCP/IP-related processing, where the servers are accessed via an Infiniband fabric and are coupled to a plurality of clients, wherei the plurality of clients are accessed via a TCP/IP network . TCP/IP connections between the plurality of clients and the server are accelerated. The apparatus includes an accelerated connection processor and a target channel adapter. The accelerated connection processor bridges TCP/IP transactions between the plurality of clients and the server, where the accelerated connection processor accelerates the TCP/IP connections by prescribing Infiniband remote direct memory access operations to retrieve/provide transaction data from/to the servers. The accelerated connection processor has a connection correlator that is configured to associate TCP/IP connection parameters with a target work queue number for each of a plurality of accelerated TCP/IP connections. The target channel adapter is coupled to the accelerated connection processor. The target channel adapter executes the Infiniband remote direct memory access operations to retrieve/provide the transaction data. The TCP/IP transactions are accelerated by offloading TCP/IP processing otherwise performed by the servers to retrieve/provide transaction data.

Although Susnow's host system is capable of performing remote direct memory access operations (as would any Infiniband-based host adapter), nowhere within the specified reference does he suggest acceleration of a TCP/IP connection by prescribing Infiniband remote direct memory access operations, where TCP/IP transactions are accelerated by offloading TCP/IP processing otherwise performed by servers to retrieve/provide

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transaction data. Susnow does not even identify TCP/IP processing in a server as a problem to be solved. This is because Susnow is concerned with synchronizing physical layer communications over a disparate computer network—exclusively. Susnow does not address acceleration of a TCP/IP connection. And Cheriton does not address use of Infiniband, or any other rdma-capable network, to accelerate TCP/IP connections.

Claim 1, as amended, is provided below for ease of reference.

1. A TCP-aware target adapter, for accelerating TCP/IP connections between a plurality of clients and a plurality of servers, the plurality of servers being accessed via an Infiniband fabric, the plurality of clients being accessed via a TCP/IP network, the TCP-aware target adapter comprising:
 - an accelerated connection processor, configured to bridge TCP/IP transactions between the plurality of clients and the plurality of servers, wherein said accelerated connection processor accelerates the TCP/IP connections prescribing Infiniband remote direct memory access operations to retrieve/provide transaction data from/to the plurality of servers, wherein said accelerated connection processor comprises:
 - a connection correlator, configured to associate TCP/IP connection parameters with a target work queue number for each of a plurality of accelerated TCP/IP connections; and
 - a target channel adapter, coupled to said accelerated connection processor, configured to support Infiniband operations with the plurality of servers, and configured to execute said Infiniband remote direct memory access operations to retrieve/provide said transaction data;
- whereby the TCP/IP connections are accelerated by offloading TCP/IP processing otherwise performed by the plurality of servers to retrieve/provide said transaction data.

In rejection of claim 1, the Examiner states that Susnow teaches a TCP-aware target adapter (Fig 3, item 360), for accelerating TCP/IP connections between a plurality of

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clients and a plurality of servers (Col. 3, lines 47-53), the plurality of servers being accessed via an Infiniband fabric (Col. 2, lines 55-60), the plurality of clients being accessed via a VI network (Col. 6, lines 28-45, wherein the VI is an improvement of TCP/IP, VI contains transport level reliability functions, and is able to allow faster I/O communication between network devices, in other words, VI interface is a scaled down version of TCP/IP protocol for improvement in speed and reduction of software overhead), the TCP-aware target adapter comprising:

- an accelerated connection processor, configured to bridge TCP/IP transactions between the plurality of clients and the plurality of servers (Fig 3, item 330), wherein said accelerated connection processor accelerates the TCP/IP connections by prescribing remote direct memory access operations to retrieve/provide transaction data from/to the plurality of servers (Col. 4, lines 40-41); and
- a target channel adapter (Fig 4, item 339, it should be noted that Host and Target channel adapter's naming convention is direction specific, host transmits data to the receiver, host channel adapter have similar purpose as target channel adapter, they both interface the host to the Infiniband network, this can be supported in Col. 3, lines 42-60), coupled to said accelerated connection processor, configured to support Infiniband operations with the plurality of servers, and configured to execute said remote direct memory access operations to retrieve/provide said transaction data (Col. 4, lines 30-41; Col. 3, lines 47-55).

In addition, the Examiner notes that Susnow does not explicitly teach:

- Whereby the TCPIIP connections are accelerated by offloading TCP/IP processing otherwise performed by the plurality of servers to retrieve/provide said transaction data;
- TCP/IP Communications;
- Intercepting commands provided to the servers' TCP/IP stacks;

The Examiner noted that in a similar system, Cheriton teaches using RDMA in a TCP/IP framework (Col. 3, lines 39-57). Specifically, that Cheriton discloses of the overhead

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caused by traditional memory copy operations (Col. 3, lines 27-31), and a method to overcome such deficiencies by using RDMA in order to improve performance. The Examiner stated that the offloading is equivalent to RDMA process wherein a remote device performs functionalities on server's behalf so server's resources are freed up. The Examiner also noted that Jinzaki teaches that it is conventional in the art to add TCP/IP onto existing VIA architecture (Jinzaki, Fig. 4), and that Avery teaches intercepting commands provide to servers' TCP/IP stacks (Avery, [0033], where the work queue holds instructions that instruct the client where to place data that is received from another process, when client submits a work request to its respective channel adapter and the work request causes an instruction called a work queue entry to be placed on the appropriate send work queue). The Examiner concluded that it would have been obvious to the person ordinary skilled in the art at the time of the invention to combine teachings of Susnow and Cheriton and to have used RDMA to accelerate TCP/IP communications in Susnow's system for the performance gain achieved by using RDMA (Col. 3, lines 39-47). The Examiner also concluded that it would have been obvious to the person or ordinary skill in the art at the time of the invention to incorporate Jinzaki with Susnow, because the combination would improve the compatibility of Susnow's system by providing TCP/IP support on VIA architecture (Jinzaki, Fig. 4). The Examiner also observed that it would have been obvious to the person or ordinary skill in the art at the time of the invention to incorporate Avery with Susnow because the combination would improve the functionality and organization of Susnow by having a memory location to store the instructions prior to being processed (Avery, [0008]).

In response to Applicant's previous arguments, the Examiner writes that "VIA (Virtual Interface Architecture), while providing high reliability, does not specify the implementation of certain transport level functions to include flow control, buffer management, segmentation and reassembly, and link synchronization, and that Applicant further traverses that VIA is a modified version of TCP/IP. In response to Applicant's argument, the examiner wrote that it should be noted that VIA's advantage over TCP/IP is improvement in speed through RDMA process among other improvements (see for example, "Virtual Interface Architecture Overview", Pathikonda et al. 1998, pg 6, 19),

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and furthermore, that VIA can be modified to include TCP/IP functionalities, see for example, "Construction of Virtual Private Distributed System by Comet", Jinzaki et al. January 2000, "3.3 Comet VIA, 1st and 2nd paragraph", and that this is done so to allow support of TCP/IP functionalities in VIA. Thus, in Susnow teaches this claim limitation in view of the above related references.

In response to Applicant's assertion that Susnow fails to disclose a work queue, and that he does not suggest any means whatsoever of accelerating a TCP/IP connection by executing a RDMA operation to receive/transmit transaction data, the Examiner noted that in a similar system Cheriton teaches using RDMA in a TCP/IP framework. Specifically, that Cheriton discloses of the overhead caused by traditional memory copy operations (Col. 3, lines 27-3 I), and a method to overcome such deficiencies by using RDMA in order to improve performance. The offloading is equivalent to RDMA process wherein a remote device performs functionalities on server's behalf so server's resources are freed up. The Examiner concluded that it would have been obvious to the person ordinary skilled in the art to have used RDMA to accelerate TCP/IP communications for the performance gain achieved by using RDMA (Col. 3, lines 39-47).

In response to Applicants remark argued in substance that Cheriton fails to disclose or suggest a connection correlator that is configured to associate TCP/IP connection parameters with a target work queue number for each of a plurality of accelerated TCP/IP connections, the Examiner responded that Cheriton teaches in Col. 3, lines 38-45, lines 54-57; Col. 4, lines 37-44, wherein the queue are the memory copying targeted through RDMA operation i.e. source to destination, hence there is the association between the memories being copied and the TCP/IP connections, furthermore, RDMA operation accelerates TCP/IP connection as taught in Cheriton.

Applicant respectfully disagrees with the Examiner's characterization of the teachings of Susnow for the following reasons. First, Susnow does not teach, or even suggest, that TCP/IP connections between a plurality of clients and a server can be accelerated by prescribing remote direct memory access operations. Although he does discuss using VI, circuitry of which is provided within a virtual expansion bridge 670 in his invention, it is

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taught that the function of the bridge 670 is to transition data from an NGIO or Infiniband host channel adapter therein to the memory controller hub 620 (col. 6, lines 18-20). Susnow teaches that the VI architecture, while providing high reliability, does not specify the implementation of certain transport level functions to include flow control, buffer management, segmentation and reassembly, *and link synchronization*, the problem noted and addressed by the noted reference. Thus, it follows that Susnow teaches utilizing an NGIO or Infiniband fabric to execute VI transactions between his host system 330 and other devices as noted in Figure 3. In fact, it is the particular employment of VI that creates the very link synchronization problem which is pointed out by Susnow.

Furthermore, Applicant respectfully disagrees with both the Examiner's and Susnow's characterization of the VI architecture as being a modified version of TCP/IP. More specifically, the VI Architecture Specification cited by Susnow (col. 6, lines 42-48) does not specify a particular implementation of transport, network, or link layers. A VI configuration can be implemented without employing TCP/IP. In another reference, for example, that was provided by the Examiner in an office action in a related case ("Virtual Interface (VI) Architecture Overview"), Pathikonda et al. teach that VI needs to be fully defined to allow implementation (p. 25) and that the VI specification is OS, processor, and interconnect independent (p. 9), and that VI architecture is interconnect neutral (p. 32). Applicant would like to specifically and respectfully point out that Susnow does not teach that VI is a modified or improved version of TCP/IP, as the Examiner has inferred. Rather, Susnow states, but provides no specific support for, that VI is "an improvement over TCP/IP communication protocols in certain network environments." (col. 6, lines 29-30). One is left to infer the reasoning for Susnow's statement about VI from the context of his patent. Certainly VI specifies reliable connections. *But VI does not specify underlying transport and network mechanisms.* And since VI does not specify the underlying transport and network mechanisms, then it cannot be inferred that VI is either a modified or an improved version of TCP/IP. Rather, all that can be inferred is that VI is an upper layer protocol that provides for RDMA, and that no underlying transport mechanisms are specified. And even to add an RDMA protocol on top of TCP/IP does not suggest or provide any motivation to accelerate a TCP/IP connection, as Applicant

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has noted in the instant application. Thus, it is an improper to infer that Susnow teaches acceleration of TCP/IP connections. In fact, Susnow goes on to set up his link synchronization problem by listing transport level functions that TCP/IP provides (e.g. flow control, segmentation and reassembly, and link synchronization), but which VI does not perform. (col. 6, lines 49-52) In essence, Susnow is dealing with a problem created by having a VI-based system that is trying to communicate in the absence of features provided by TCP/IP. His link synchronization invention is actually attempting to add a feature of TCP/IP to address a limitation of VI.

Thus, one skilled in the art will conclude that Susnow does not teach VI as an improved version of TCP/IP—he does not state this at all—but rather that VI is an improvement over TCP/IP protocols in certain environments in the sense that VI specifies a reliable connection. That is the extent of Susnow's teaching regarding TCP/IP. The Examiner has stated that the VI architecture is disclosed numerously in the forgoing office action and with the IDS, and thus there is no need to further elaborate. Applicant respectfully disagrees and notes that VI does not specify an underlying transport mechanism. One skilled in the art will concur that the goal of the those developing the VI architecture was to specify RDMA capabilities without specifying underlying transport. Infiniband, for example, in contrast, improved upon the RDMA capabilities of VI and furthermore specifies an underlying transport and physical layer. Thus, Applicant wishes to address, acceleration of TCP/IP connections by taking advantage of the RDMA capabilities of Infiniband or any other network that is RDMA-capable, within a server network, by prescribing RDMA operations to accomplish the data transfer. VI is definitely not an alternate version of TCP/IP, nor is it a modified version of TCP/IP, for VI does not specify an underlying transport. VI can indeed be employed over the top of TCP/IP, but Susnow does not teach this. Rather, Susnow shows VI over the top of Infiniband or NGIO (see Fig. 6, element 371). But both VI and Infiniband specify reliable connections and RDMA, so one skilled in the art would conclude from the discussion with reference to figure 6 that Susnow wishes to employ NGIO or Infiniband underlying transport mechanisms in a VI-based system.

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Jinzaki may teach adding TCP/IP onto existing VIA architecture (Jinzaki, Fig 4), but Jinzaki is absolutely silent with regard to any remaining elements of the independent claims. And regarding adding TCP/IP onto existing VIA architecture, Jinzaki only shows a block in a figure.

And Susnow certainly does not teach that a TCP/IP connection can be accelerated through the employment of remote direct memory access operations, whereby the TCP/IP connections are accelerated by offloading TCP/IP processing otherwise performed by the plurality of servers to retrieve/provide said transaction data. Applicant has studied the teachings of Susnow and finds that he utterly fails to teach, suggest, allude to, or even hint that one skilled in the art would be motivated to accelerate a TCP/IP connection by prescribing remote direct memory access operations to send/receive transaction data. Jinzaki adds nothing that would motivate one skilled in the art to modify Susnow's invention to provide that which is claimed by applicant.

In addition, Cheriton refers to RDMA in the sense that an option field must be provided in a TCP header to identify data within the TCP payload that can be placed in memory directly rather than undergoing the buffer copies required by a TCP/IP stack. But intermediate buffer copies only reduces the overhead of TCP/IP. Cheriton does not mention reducing other overhead-related functions such as context switches, etc. Thus, Cheriton does not teach offloading in the sense that Applicant teaches in the instant application. Rather, Applicant teaches offloading by prescribing RDMA operations to retrieve/provide said transaction data. And the only context that Cheriton mentions Infiniband within is to identify Infiniband as a new protocol that responds to the problem of unacceptable overhead requirements in network remote DMA. (col. 1, lines 55-61) Furthermore, as noted above, Cheriton's teaching utterly lacks any suggestion that TCP/IP connection parameters may be associated or correlated with a single work queue number. Although Pathikonda teaches VIA send queues and receive queues directly accessible from user space, in accordance with Virtual Interface Architecture Version 1.0 Specification, and that there are work queues on the host, Pathikonda, Susnow, Jinzaki, and Cheriton are utterly silent with regard to the notion that one may correlate TCP/IP connection parameters with a specific work queue number. Most respectfully, Applicant

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submits that the Examiner has gathered together a "bucket of parts" and has employed hindsight to configure an invention as recited in claim 1. Not one of these references provide any motivation to one skilled in the art to combine all these references together such that limitations as recited in claim 1 are made obvious.

For these reasons, it is respectfully requested that the rejection of claim 1 be withdrawn.

By this communication, claim 6 is cancelled, thereby rendering the rejection moot.

With respect to claims 2-5 and 7-8, these claims depend from claim 1 and add further limitations that are neither anticipated nor made obvious by Susnow, Cheriton, Pathikonda, Jinzaki, Avery, or any of these five references in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections to claims 2-5 and 7-8 as well.

Independent claims 9, 16, 23, 27, 30, and 40 recite substantially similar limitations as claim 1, in particular:

- Prescribing RDMA transactions over an Infiniband fabric to accelerate transfer of data corresponding to the TCP/IP connections, thereby bypassing the TCP/IP stack; and
- Mapping TCP/IP connection parameters for accelerated connections to a corresponding work queue number that corresponds to a work queue pair;

And, as argued above in traversal of the rejection of claim 1, Susnow, Cheriton, Pathikonda, Jinzaki, and Avery fails to teach or suggest the above-noted limitations. Rather, Susnow addresses a problem inherent in a VI-based system and attempts to provide attributes of TCP (i.e., link synchronization); Cheriton proposes a shim protocol on top of TCP to allow for data placement in memory, but he is utterly silent with regard to work queue numbers or work queue pairs which constitute an application level interface. Jinzaki and Pathikonda teach that VI may employ TCP/IP as an underlying transport protocol, but they are silent with regard to how VI may employ such. And Avery teaches that commands may be intercepted from a server's TCP/IP stack where a

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work queue holds instructions that instruct the client where to place data that is received from another process, when the client submits a work request to its respective channel adapter and the work request causes an instruction called a work queue entry to be placed on the appropriate send work queue.

Consequently, Applicant respectfully requests withdrawal of the rejections of claims 9, 16, 23, 27, 30, and 40.

With respect to claims 10-12 and 14-15, these claims depend from claim 9 and add further limitations that are neither anticipated nor made obvious by any of the above-noted references, alone or in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections to claims 10-12 and 14-15 as well.

By this amendment, claim 16 is cancelled, thereby rendering the rejection moot.

With respect to claims 17-19 and 21-22, these claims depend from claim 16 and add further limitations that are neither anticipated nor made obvious by any of the above-noted references, alone or in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections to claims 17-19 and 21-22.

With respect to claims 24-26, these claims depend from claim 23 and add further limitations that are neither anticipated nor made obvious by any of the above-noted references, alone or in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections to claims 24-26.

By this amendment, claim 28 is cancelled, thereby rendering the rejection moot.

With respect to claim 29, this claim depends from claim 27 and adds further limitations that are neither anticipated nor made obvious by any of the above-noted references, alone or in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejection of claim 29.

With respect to claims 31-33 and 35-39, these claims depend from claim 30 and add further limitations that are neither anticipated nor made obvious by any of the above-noted references, alone or in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections to claims 31-33 and 35-39.

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By this amendment, claim 34 is cancelled, thereby rendering the rejection moot.

With respect to claims 41-45, these claims depend from claim 40 and add further limitations that are neither anticipated nor made obvious by any of the above-noted references, alone or in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw his rejections to claims 41-45.

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CONCLUSIONS

In view of the arguments advanced above, Applicant respectfully submits that claims 11-5, 7-12, 14-19, 21-27, 29-33, and 35-45 are in condition for allowance. Reconsideration of the rejections is requested, and allowance of the claims is solicited.

Applicant earnestly requests that the Examiner contact the undersigned practitioner by telephone if the Examiner has any questions or suggestions concerning this amendment, the application, or allowance of any claims thereof.

I hereby certify under 37 CFR 1.8 that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office on the date of signature shown below.

Respectfully submitted,
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07/12/2006

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